Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (currently amended) A method for maintaining synchronization in a communication system wherein a central entity transmits a signal containing timing information to one or more remote devices, the one or more remote devices using the timing information for scheduling transmissions, the method comprising:

receiving a first signal from the central entity; ~~and~~

generating a symbol clock based on timing information included in the first signal;

upon a loss of reception of the first signal, maintaining the symbol clock to generate a maintained symbol clock;

receiving a second signal from the central entity;

determining a symbol clock offset between the first signal and the second signal using the maintained symbol clock; and

adjusting the maintained symbol clock based on the symbol clock offset to generate an adjusted symbol clock.

2. (currently amended) The method of claim 1, further comprising:

providing the adjusted symbol clock to an upstream transmitter.

3. (previously presented) The method of claim 1, further comprising:

detecting a loss of reception of the first signal.

4. (previously presented) The method of claim 1, wherein determining the symbol clock offset using the maintained symbol clock comprises identifying a symbol clock offset value that obtains a valid alignment for forward error correction (FEC) decoding of the data in the second signal.

5. (previously presented) The method of claim 1, wherein determining the symbol clock offset using the maintained symbol clock comprises identifying a symbol clock offset value that obtains a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of the data in the second signal.

6. (previously presented) The method of claim 1, wherein determining the symbol clock offset using the maintained symbol clock comprises identifying a symbol clock offset value that obtains a valid frame alignment for Reed-Solomon decoding of the data in the second signal.

7. (currently amended) A method for maintaining synchronization in a communication system wherein a central entity transmits a signal containing timing information to one or more remote devices, the one or more remote devices using the timing information for scheduling transmissions, the method comprising:

receiving a first signal from the central entity; ~~and~~

generating a symbol clock based on timing information included in the first signal;

upon a loss of reception of the first signal, maintaining the symbol clock to generate a maintained symbol clock;

receiving a second signal from the central entity;

determining a symbol clock offset between the first signal and the second signal using the maintained symbol clock;

wherein determining the symbol clock offset using the maintained symbol clock comprises:

identifying a first symbol clock offset that obtains a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of first encoded data in the second signal;

identifying a second symbol clock offset that obtains a valid frame alignment for Reed-Solomon decoding of second encoded data in the second signal; and

combining the first symbol clock offset and the second symbol clock offset to generate a combined symbol clock offset; and

adjusting the maintained symbol clock based on the combined symbol clock offset to generate an adjusted symbol clock.

8. (currently amended) A method for maintaining synchronization in a communication system wherein a central entity transmits a signal containing timing information to one or more remote devices, the one or more remote devices using the timing information for scheduling transmissions, the method comprising:

receiving a first signal from the central entity; ~~and~~

generating a symbol clock based on timing information included in the first signal;

receiving calibration information from the central entity relating to a difference in forward error correction (FEC) alignment between the first and second signals;

upon a loss of reception of the first signal, maintaining the symbol clock to generate a maintained symbol clock;

receiving a second signal from the central entity;

determining a symbol clock offset between the first signal and the second signal using the maintained symbol clock,

wherein determining the symbol clock offset includes accounting for the difference in FEC alignment between the first and second signals; and

adjusting the maintained symbol clock based on the symbol clock offset to generate an adjusted symbol clock.

9. (previously presented) The method of claim 1, further comprising:

receiving a notification message from the central entity indicating that the first signal will be terminated.

10. (currently amended) A method for maintaining synchronization in a communication system wherein a central entity transmits a signal containing timing information to one or more remote devices, the one or more remote devices using the timing information for scheduling transmissions, the method comprising:

receiving a first signal transmitted from the central entity;

generating a symbol clock based on timing information included in the first signal;

storing calibration information relating to a timing difference between the first signal and a second signal transmitted from the central entity ~~information associated with the timing information to provide delayed timing information~~; ~~and~~

~~upon a loss of reception of the signal,~~

upon a loss of reception of the first signal, maintaining the symbol clock;

accessing the calibration ~~delayed timing~~ information; [[to]]

determining a symbol clock offset between the first signal and the second signal based on the calibration information; and

adjusting the symbol clock based on the symbol clock offset ~~maintain the symbol clock~~.

11. (currently amended) The method of claim 10, wherein storing the calibration information ~~associated with the timing information~~ includes storing the calibration information for a predetermined period of time.

12. (currently amended) The method of claim 10, wherein accessing the ~~delayed timing~~ calibration information includes accessing the ~~delayed timing~~ calibration information representative of a time period immediately before the loss of reception of the first signal.

13. (currently amended) The method of claim 10, wherein accessing the ~~delayed timing~~ calibration information includes accessing the calibration ~~delayed timing~~ information representative of a time period ending at least one clock cycle before the loss of reception of the first signal.

14. (currently amended) The method of claim 10, wherein storing calibration information ~~associated with the timing information~~ includes storing ~~the~~ calibration data ~~information~~ received from at least one of a loop filter, a numerically controlled oscillator, and a voltage controlled oscillator.

15. (previously presented) The method of claim 10, further including analyzing the information associated with the timing information to determine when the loss of reception of the signal occurs.

16. (currently amended) An apparatus in a communication system, the apparatus comprising:

a receiver configured to receive a plurality of signals from a central entity;

a clock generation element configured to

generate a symbol clock based on timing information included in a first signal received by the receiver and

generate a maintained symbol clock comprising maintaining ~~maintain~~ the symbol clock upon a loss of reception of the first signal;

an offset determination element configured to determine a symbol clock offset between the first signal and a second signal received by the receiver using the maintained symbol clock; and

an upstream timing element configured to adjust the maintained symbol clock based on the symbol clock offset to generate an adjusted symbol clock.

17. (currently amended) The apparatus of claim 16 further including an upstream transmitter configured to receive the adjusted symbol clock.

18. (previously presented) The apparatus of claim 16 further including a loss detection element configured to detect a loss of reception of the first signal.

19. (previously presented) The apparatus of claim 16, wherein the offset determination element is configured to determine the symbol clock offset by identifying a symbol clock offset that obtains a valid alignment for forward error correction (FEC) decoding of the data in the second signal.

20. (previously presented) The apparatus of claim 16, wherein the offset determination element is configured to determine the symbol clock offset by identifying a symbol clock offset that obtains a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of the data in the second signal.

21. (previously presented) The apparatus of claim 16, wherein the offset determination element is configured to determine the symbol clock offset by identifying a symbol clock offset that obtains a valid frame alignment for Reed-Solomon decoding of the data in the second signal.

22. (previously presented) An apparatus in a communication system, the apparatus comprising:

a receiver configured to receive a signal from a central entity;

a clock generation element configured to generate a symbol clock based on timing information included in a first signal and to maintain the symbol clock upon a loss of reception of the first signal;

an offset determination element configured to determine a symbol clock offset between the first signal and a second signal using the maintained symbol clock,

wherein the offset determination element identifies a first symbol clock offset that obtains a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of first encoded data in the second signal, identifies a second symbol clock offset that obtains a valid frame alignment for Reed-Solomon decoding of second encoded data in the second signal, and combines the first symbol clock offset and the second symbol clock offset to generate a combined symbol clock offset; and

an upstream timing element configured to adjust the maintained symbol clock based on the symbol clock offset to generate an adjusted symbol clock.

23. (previously presented) An apparatus in a communication system, the apparatus comprising:

a receiver configured to receive a signal from a central entity,

wherein the receiver receives calibration information from the central entity relating to a difference in forward error correction (FEC) alignment between the first signal and the second signal prior to receiving the second signal;

a clock generation element configured to generate a symbol clock based on timing information included in a first signal and to maintain the symbol clock upon a loss of reception of the first signal;

an offset determination element configured to determine a symbol clock offset between the first signal and a second signal using the maintained symbol clock,

wherein the symbol clock offset determination includes accounting for the difference in FEC alignment between the first signal and the second signal; and

an upstream timing element configured to adjust the maintained symbol clock based on the symbol clock offset to generate an adjusted symbol clock.

24. (previously presented) The apparatus of claim 16, wherein the offset determination element determines the symbol clock offset in response to the receiver receiving the second signal and a notification message from the central entity indicating that the first signal will be terminated.

25. (original) The apparatus of claim 16, wherein the apparatus is a cable modem.

26. (currently amended) An apparatus in a communication system, the apparatus comprising:

means for receiving a first signal transmitted from a central entity;

means for generating a symbol clock based on timing information included in the first signal;

means for storing calibration information relating to a timing difference between the first signal and a second signal transmitted from the central entity ~~information associated with the timing information to provide delayed timing information~~; ~~and~~

means for maintaining the symbol clock upon a loss of reception of the first signal;

means for accessing the calibration ~~delayed timing~~ information ~~upon a loss of reception of the signal to maintain the symbol clock~~;

means for determining a symbol clock offset between the first signal and the second signal based on the calibration information; and

means for adjusting the symbol clock based on the symbol clock offset.

27. (currently amended) The apparatus of claim 26, wherein the means for storing the calibration information is configured to store the calibration information for a predetermined period of time.

28. (currently amended) The apparatus of claim 26, wherein the calibration ~~delayed timing~~ information is representative of a time period immediately before the loss of the reception of the signal.

29. (currently amended) The apparatus of claim 26, wherein the calibration ~~delayed timing~~ information is representative of a time period ending at least one clock cycle before the loss of reception of the first signal.

30. (currently amended) The apparatus of claim 26, wherein the means for storing calibration information is configured to store ~~the information~~ calibration data received from at least one of a loop filter, a numerically controlled oscillator, and a voltage controlled oscillator.

31. (previously presented) The apparatus of claim 26, further including means for analyzing the information associated with the timing information to determine when the loss of reception of the signal occurs.

32. (currently amended) The apparatus of claim 26, wherein the apparatus is a cable modem.

33. (canceled).

34. (previously presented) The method of claim 1, wherein determining the symbol clock offset comprises incrementing a counter based on the maintained symbol clock during the time period between the loss of the first signal and receipt of the second signal.

35. (previously presented) The method of claim 1, wherein determining the symbol clock offset comprises identifying a symbol clock offset value that obtains a valid packet alignment for Moving Pictures Experts Group (MPEG) data in the second signal.

36. (canceled)

37. (previously presented) The apparatus of claim 16, wherein the offset determination element comprises a counter configured to increment based on the maintained symbol clock during a time period between the loss of reception of the first signal and the receiver receiving the second signal.

38. (previously presented) The apparatus of claim 16, wherein the offset determination element configured to determine the symbol clock offset by identifying a symbol clock offset value that obtains a valid packet alignment for Moving Pictures Experts Group (MPEG) data in the second signal.

39. (currently amended) A communication system, comprising:

a central entity comprising

a first transmitter configured to transmit a first downstream ~~transmitter~~ signal, wherein the first ~~transmitter~~ downstream signal contains timing information based on a first central symbol clock[[;]], and

a second transmitter configured to transmit a second downstream signal, wherein the second downstream signal contains timing information based on a second central symbol clock; and

a remote device comprising

a receiver configured to receive the first downstream ~~a first received~~ signal~~, wherein the first received signal is the first transmitter signal as received from the central entity~~;

a clock generation element configured to

generate a remote symbol clock based on the first downstream ~~received~~ signal, and

maintain the remote symbol clock upon a loss of reception of the first downstream ~~received~~ signal to generate a maintained remote symbol clock; and

an offset determination element configured to determine a remote symbol clock offset between the first downstream ~~received~~ signal and [[a]] the second downstream ~~received~~ signal using the maintained remote symbol clock.

40. (canceled).

41. (previously presented) The system of claim 39, the remote device further comprising

an upstream timing element configured to adjust the maintained remote symbol clock based on the remote symbol clock offset to generate an adjusted remote symbol clock.

42. (previously presented) The system of claim 41, the remote device further comprising

a remote device transmitter configured to receive the adjusted remote symbol clock.

43. (canceled).

44. (currently amended) The system of claim [[43]] 39, the central entity further comprising

a synchronization element configured to synchronize the first central symbol clock and the second central symbol clock.

45. (currently amended) The system of claim 39, the remote device further comprising

a loss detection element configured to detect the loss of reception of the first downstream ~~received~~ signal.

46. (currently amended) The system of claim 39, wherein the offset determination element further comprises a counter that is incremented based on the maintained remote symbol clock during a time period between the loss of reception of the first downstream signal and the receiver receiving the second downstream signal.

47. (currently amended) The system of claim 39, wherein the offset determination element is further configured to obtain a valid packet alignment for Moving Pictures Experts Group (MPEG) data in the second downstream ~~received~~ signal.

48. (currently amended) The system of claim 39, wherein the offset determination element is further configured to obtain a valid alignment for forward error correction (FEC) decoding of the data in the second downstream ~~received~~ signal.

49. (currently amended) The system of claim 39, wherein the offset determination element is further configured to obtain a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of the data in the second downstream ~~received~~ signal.

50. (currently amended) The system of claim 39, wherein the offset determination element is further configured to obtain a valid frame alignment for Reed-Solomon decoding of the data in the second downstream ~~received~~ signal.

51. (currently amended) The system of claim 39, wherein the offset determination element identifies a first symbol clock offset that obtains a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of first encoded data in the second downstream signal, identifies a second symbol clock offset that obtains a valid frame alignment for Reed-Solomon decoding of second encoded data in the second downstream signal, and combines the first symbol clock offset and the second symbol clock offset to generate a combined symbol clock offset.

52. (currently amended) The system of claim 39, wherein

the receiver receives calibration information from the central entity relating to a difference in forward error correction (FEC) alignment between the first downstream signal and the second downstream signal prior to receiving the second signal,

and the symbol clock offset determination includes accounting for the difference in FEC alignment between the first downstream signal and the second downstream signal.

53. (currently amended) The system of claim 39, wherein the offset determination element determines the symbol clock offset in response to the receiver receiving the second downstream signal and a notification message from the central entity indicating that the first downstream signal will be terminated.

54. (previously presented) The system of claim 39, wherein the central entity is a cable modem termination system and the remote device is a cable modem.

55. (currently amended) A method for maintaining synchronization in a communications system, comprising:

transmitting a first downstream ~~transmitted~~ signal from a central entity to one or more remote devices, wherein the first downstream ~~transmitted~~ signal includes timing information based on a first central symbol clock;

receiving a first downstream ~~received~~ signal~~, wherein the first received signal is the first transmitted signal as received from the central entity,~~; ~~and~~

generating a remote symbol clock based on timing information included in the first downstream ~~received~~ signal;

upon a loss of reception of the first downstream ~~received~~ signal, maintaining the remote symbol clock;

transmitting a second downstream signal from the central entity to one or more remote devices, wherein the second downstream signal includes timing information based on a second symbol clock;

receiving a second downstream ~~received~~ signal;

determining a symbol clock offset between the first downstream ~~received~~ signal and the second ~~received~~ downstream signal using the maintained remote symbol clock; and

adjusting the maintained symbol clock based on the symbol clock offset to generate an adjusted symbol clock.

56. (previously presented) The method of claim 55, further comprising:

detecting the loss of reception of the first downstream ~~received~~ signal.

57. (currently amended) The method of claim 55, wherein the determining a symbol clock offset comprises identifying a symbol clock offset value that obtains a valid alignment for forward error correction (FEC) decoding of the data in the second downstream signal.

58. (currently amended) The method of claim 55, wherein the determining a symbol clock offset comprises identifying a symbol clock offset value that obtains a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of the data in the second downstream signal.

59. (currently amended) The method of claim 55, wherein determining a symbol clock offset comprises identifying a symbol clock offset value that obtains a valid frame alignment for Reed-Solomon decoding of the data in the second downstream signal.

60. (currently amended) The method of claim 55, wherein determining a symbol clock offset comprises:

identifying a first symbol clock offset value that obtains a valid puncture alignment for Trellis Coded Modulation (TCM) decoding of first encoded data in the second downstream signal;

identifying a second symbol clock offset value that obtains a valid frame alignment for Reed-Solomon decoding of second encoded data in the second downstream signal; and

combining the first symbol clock offset value and the second symbol clock offset value to generate a combined symbol clock offset.

61. (currently amended) The method of claim 55, further comprising:

receiving calibration information from the central entity relating to a difference in forward error correction (FEC) alignment between the first and second ~~received~~ downstream signals;

wherein determining a symbol clock offset includes accounting for the difference in FEC alignment between the first and second ~~received~~ downstream signals.

62. (currently amended) The method of claim 55, further comprising:

receiving a notification message from the central entity indicating that the first downstream signal will be terminated.

63. (currently amended) The method of claim 55, further comprising:

providing the adjusted symbol clock to an upstream transmitter.

64. (canceled).

65. (currently amended) The method of claim 55, wherein determining the symbol clock offset comprises incrementing a counter based on the maintained symbol clock during the time period between the loss of the first downstream ~~received~~ signal and receipt of the second downstream ~~received~~ signal.

66. (currently amended) The method of claim 55, wherein determining a symbol clock offset comprises identifying a symbol clock offset value that obtains a valid packet alignment for Moving Pictures Experts Group (MPEG) data in the second downstream signal.

67. (currently amended) The method of claim 55, further comprising:

synchronizing the first central symbol clock and a second central symbol clock~~; and~~

~~transmitting a second transmitted signal to one or more remote devices, wherein the second transmitted signal includes timing information based on a second central symbol clock~~.

68. (canceled).

69. (currently amended) The method of claim 67, further comprising:

transmitting a notification message to the one or more remote devices indicating that the first ~~transmitted~~ downstream signal will be terminated prior to the termination of transmission of the first ~~transmitted~~ downstream signal.

70. (currently amended) The method of claim 67, further comprising:

transmitting calibration information relating to a difference in FEC alignment between the first and second ~~transmitted~~ downstream signals.

71. (new) The method of claim 1, wherein the first signal is transmitted by a first transmitter of the central entity and the second signal is transmitted by a second transmitter of the central entity.

72. (new) The method of claim 10, wherein the first signal is transmitted by a first transmitter of the central entity and the second signal is transmitted by a second transmitter of the central entity.